



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Construction Engineering & Management

Course / Subject Code: ME01014011

Course / Subject Name : Construction Project Planning Scheduling and Management

w. e. f. Academic Year:	2024-25
Semester:	1 <sup>st</sup> Semester
Category of the Course:	PCC

<b>Prerequisite:</b>	General Concept of Construction Practices and Civil Engineering
<b>Rationale:</b>	To study and comprehend the principles of planning, scheduling, and controlling the costs and quality associated with construction projects. This includes ensuring safety throughout the construction process, organizing project information efficiently, and utilizing it effectively. By understanding these concepts, one can manage construction projects more successfully, maintaining high standards and meeting deadlines. Additionally, it involves analyzing the methodologies for coordinating various construction activities to ensure seamless project execution.

No	Program Outcomes
01	Engage in critical thinking and research to develop solutions to multifold real-world problems.
02	Communicate effectively with the engineering community at large level on complex design tasks & prepare best workouts and deliverables.
03	Demonstrate a high level of professionalism in handling multidisciplinary and complex Construction engineering and management problems.
04	Plan, Schedule, Manage and Control the complex construction and infrastructure projects in a sustainable local and global context.
05	Address technical, societal issues pertaining to Construction engineering & management by offering state of art and robust, sustainable and practical solutions while upholding high standards of ethics and professionalism.



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## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1.	Understand the concept of planning, scheduling, cost and quality control during construction, organization and use of project information necessary for construction project.	U, R
2.	Apply the principles of planning, scheduling and management for construction activities and entire construction project for effective and measurable outcomes.	A, N
3.	Demonstrate an ability to develop the various components of project controls including planning, scheduling, cost and resource management.	A

*\*Revised Bloom's Taxonomy (RBT)*

## Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA/ CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<b>Construction Projects and its Management</b> Construction projects & their features, Requirements and types of a project organization, Management of Construction project and its purpose. Construction Project Management –Project Life cycle from Pre-Contract to Closure, Initiation, Planning, Execution, Monitoring & control and closing, factors influencing project performance, Project Team and their roles, Iron triangle Project Scope, Time& cost, Project Strategy, Project Feasibility.	10	15



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2.	<b>Construction Project Planning</b> Planning - Development of Construction Plans, Need of sound Planning, Scheduling, principles and techniques, Work Tasks, Defining precedence relationships among activities, Estimating activity durations, Identifying the resource and estimation of resource requirements for the work activities.	9	15
3.	<b>Construction Project Scheduling</b> Scheduling and Monitoring – Critical Path Method, Scheduling Calculations of Event time/Activity time, Critical activities and critical paths, Activity floats , Float ,AOA and AON Networks, , Time grid diagrams & resource allocation, Project updating, Time-cost optimization of networks, Cost control and monitoring using CPM networks, Network scheduling with limited resources, resource allocation, smoothing and levelling, updating the network, risk of schedule delays, missing milestone deliverables and its impact.	14	40
4.	<b>Construction Project Planning &amp; Scheduling Techniques</b> Work Breakdown Structure, CPM, PERT & GERT, LOB & LADDER Networks, Precedence Networks, Computer Application for scheduling and planning , Introduction of Primavera and Microsoft Project software and Worksheet based project planning and scheduling.	12	30
<b>Total</b>		<b>45</b>	<b>100</b>

**Suggested Specification Table with Marks (Theory):**

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
30	20	20	20	10	--

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources

### Books:

1. Calin M. Popescu, Chotchai Charoenngam, "Project Planning, Scheduling and Control in Construction: An Encyclopaedia of terms and Applications", Wiley, New York, 1995.
2. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control",



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McGraw-Hill Publishing Company, New Delhi, 1998.

3. Harris, F, McCaffer, R and Edum-Fotwe, F (2006) Modern Construction Management, sixth edition, Blackwell Publishers.
4. Jha, K N (2011) Construction Project Management, First Edition, Pearson Publishers.
5. Knutson, K, Schexnayder, C J, Fiori, C. and Mayo, R E (2013) Construction Management Fundamentals, MCGraw Hill Publishers.
6. Mubarak, S (2010) Construction project scheduling and control, second edition, John Wiley and sons.
7. Willis, E. M., "Scheduling Construction Projects", John Wiley & Sons, 1986.

## (b) Software and website:

1. Microsoft Project
2. Primavera
3. [www.nptel.iitm.ac.in/courses/](http://www.nptel.iitm.ac.in/courses/)

## Suggested Course Assignment /Tutorial List:

### Practical Work Assignments Based on :

1. Work breakdown structure (WBS)
2. Development of Activity logical Relations
3. Bar charts & Milestone Chart
4. CPM network developments (AOA & AON)
5. CPM network analysis (Event times/activity times/floats)
6. Project updating
7. Project crashing (time-cost optimization)
8. PERT network analysis
9. Line of Balance Method (LOB)
10. Software Based Work Assignment (To be issued at the beginning and to be developed throughout)

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